REMARKS

This is a full and timely response to the Final Office Action (Paper No. 9) mailed by the U.S. Patent and Trademark Office on January, 2003. Upon entry of this Response with Amendments, claims 19, 24-26, 37, 38 and 41 are without prejudice waiver or disclaimer, and claims 36, 39, 40 and 42 stand pending in the present application. Independent claim 36 has been amended to comply with 35 U.S.C. §112, Second Paragraph, and to further define the present invention. It is believed that no new matter has been introduced by way of these amendments. In view of the foregoing amendments and following remarks, reconsideration and allowance of the present application and claims are respectfully requested.

Rejections under 35 U.S.C. §112, Second Paragraph

Claim 36, 39, 40, and 42 stand rejected under 35 U.S.C. §112, Second Paragraph, as being indefinite for failing to particular point out and distinctly claim the subject matter, which Applicants regards as the invention. Applicants have amended claim 36 to delete "ions" and have amended claim 36 to recite "a second electrical potential, which is negative ..." and " a third electrical potential, which is positive ... ." Accordingly, Applicants respectfully submit that claim 19 is in compliance with 35 U.S.C. § 112, Second Paragraph, and respectfully request that the rejection be withdrawn.

Rejections under 35 U.S.C. §102

Claims 39, 40, and 42 stand stand rejected under 35 U.S.C. §102(b) as being anticipated by Kaji et al. (US Patent No. 5,290,993) and and Okano et al. (JP 56-81678-A). A proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of

the claim. See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983). Anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. See e.g., In re: Paulsen, 30 F.3d 1475, 31 USPQ 2d 1671 (Fed. Cir. 1994); In re Spada, 911 F.2d 705, 15 USPQ 2d 1655 (Fed. Cir. 1990). Alternatively, anticipation requires that each and every element of the claimed invention be embodied in a single prior art device or practice. See, e.g., Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopedics, Inc., 976 F.2d 1559, 24 USPQ 2d 1321 (Fed. Cir. 1992). For anticipation, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. See, e.g., Scripps Clinic & Res. Found. v. Genentech, Inc., 927 F.2d 1565, 18 USPQ 2d 1001 (Fed. Cir. 1991.)

Accordingly, the single prior art reference must properly disclose, teach or suggest each element of the claimed invention.

It is alleged in the Office Action that:

> Kaji et al teach an apparatus (Fig.1) for plasma etching a sample 14, the apparatus comprising:
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> a bell jar 3 and a vessel 4 defining a plasma generating and plasma processing space (*plasma reactor*), wherein the plasma is generated by a microwave generator 1; and
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> a sample table 10 (*mechanical support within the plasma reactor*), wherein the sample table 10 is coupled to an AC power source 16 and a DC power source 18 for applying a bias voltage on the sample table 10 (*the support is electrically connected to both a dc and an ac bias source*) (column 2, line 41 through column 3, line 41).
>
> *Regarding process limitation (responsive to electrically biasing the substrate to a first electrical potential, the substrate is electrically neutralized by positive ions of the plasma, and whereby responsive to electrically biasing the substrate to a second electrical potential, the substrate is etched by electrons of the plasma)*: The apparatus is inherently capable of being operated under the condition cited in the claims, that is, electrically biasing to a first electrical potential to neutralize the substrate and to a second potential to etch the substrate by plasma electrons. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528,

> 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed dos not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

With regards to *Kaji et al.*, Applicants submit that *Kaji et al.* fails to disclose each feature of the claimed invention. Specifically in claim 36, Applicants have claimed "**a pulse waveform power source** adapted to electrically bias said mechanical support and said substrate placed thereon ... ." Applicants respectfully submit that *Kaji et al.* apparently fails to disclose a pulse waveform power source adapted to electrically bias said mechanical support. Rather, *Kaji et al.* apparently discloses a sinusoidal alternating current power source. (See FIG. 1 and col. 3, line 21.) Therefore, Applicants do not believe that *Kaji et al.* anticipates the claimed invention and respectfully request that the rejection be withdrawn.

It is further alleged in the Office Action that:

> Okano et al teach an apparatus (Fig. 5) for plasma etching a material, the apparatus comprising:
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> a *plasma reactor* 36, wherein the plasma is generated by a high frequency power source 31 coupled to discharge electrodes 28, 29; and
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> an electrode 25 supporting a material 26 to be etched (*mechanical support within the plasma reactor*), wherein the material support electrode 25 is coupled to an AC power supply 33 and a DC power supply 35 for applying a superimposed bias current on the material support electrode 25 (*the support is electrically connected to both a dc and an ac bias source*) (abstract describing Fig. 3 having components similar to those shown in Fig. 5).
>
> *Regarding process limitation (responsive to electrically biasing the substrate to a first electrical potential, the substrate is electrically neutralized by positive ions of the plasma, and whereby responsive to electrically biasing the substrate to a second electrical potential, the substrate is etched by electrons of the plasma)*: The apparatus is capable of being operated under the condition cited in the claims, that is, electrically biasing to a first electrical potential to neutralize the substrate and to a second potential to etch the substrate by plasma electrons. It has been held

> that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed dos not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham,* 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

With regards to *Okano et al.*, Applicants respectfully request that the USPTO either provide further explanation of the reference or an English translation of the reference or withdraw the reference. Under 37 CFR §1.104(c)(2), "[t]he pertinence of each reference, if not apparent, must be clearly explained in each rejected claim specified." In light of the English translation of the abstract, Applicants respectfully submit that there is no indication of "a pulse waveform power supply," as claimed by Applicants in claim 36. Therefore, Applicants do not believe that the reference anticipates the claimed invention and respectfully request that the rejection be withdrawn.

Rejections under 35 U.S.C. §103

Claim 36 stands rejected under 35 U.S.C. §103 as being unpatentable over Gorin (U.S. Pat. No. 4,464,223) in view of *Kaji et al.* It is further alleged in the Office Action that:

> Gorin teaches an apparatus (Fig.2) for plasma etching a workpiece, the apparatus comprising:
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> a reactor defining a reaction volume 20 (*plasma reactor*), wherein the plasma is generated by a high frequency power source 30 coupled to a plasma generating electrode 12; and
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> a workpiece support electrode 14 (*mechanical support within the plasma reactor*), wherein the workpiece support electrode 12 is coupled to an AC power supply 36 and a DC power supply 42 for applying a bias voltabe on the workpiece support electrode 12 (*the support is electrically connected to both a dc and an ac bias source*) (column 2, line 7 through column 3, line 17).
>
> *Regarding process limitation (responsive to electrically biasing the substrate to a first electrical potential, the substrate is electrically*

> *neutralized by positive ions of the plasma, and whereby responsive to electrically biasing the substrate to a second electrical potential, the substrate is etched by electrons of the plasma)*: The apparatus is inherently capable of being operated under the condition cited in the claims, that is, electrically biasing to a first electrical potential to neutralize the substrate and to a second potential to etch the substrate by plasma electrons. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed dos not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

With regards to *Gorin* and *Kaji et al.*, Applicants have claimed in claim 36 "a pulse waveform power source adapted to electrically bias said mechanical support... ." According to the Office Action, *Gorin* discloses " a workpiece support electrode 14 ... coupled to an AC power supply 36 ... for applying a bias voltage on the workpiece support electrode 12." Applicants respectfully submit that the combination of *Gorin* and *Kaji et al.* fails to disclose a pulse waveform power source, as claimed by Applicants in claim 36. Accordingly, Applicants respectfully request that the rejection of claim 36 based upon the above references be withdrawn.

CONCLUSION

For at least the foregoing reasons, Applicants respectfully request that all outstanding rejections be withdrawn and that all pending claims of this application be allowed to issue. If the Examiner has any comments regarding Applicants' response or intends to dispose of this matter in a manner other than a notice of allowance, Applicants request that the Examiner telephone Applicants' undersigned attorney.

Respectfully submitted,

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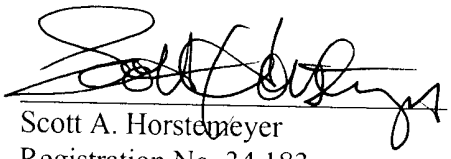
By: 
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ANNOTATED VERSION OF MODIFIED CLAIMS TO SHOW CHANGES MADE

The following is a marked up version of the amended claims. Amend the following claims by adding the language that is underlined ("___") and by deleting the language that is enclosed within brackets ("[ ]"):

36. (Once Amended) An apparatus for low-damage anisotropic dry etching of a substrate, comprising:

a plasma reactor having a plasma creation means, the plasma reactor adapted to have a plasma at a first electrical potential therein;

a mechanical support within said plasma reactor adapted to receive said substrate, wherein said mechanical support is electrically isolated from said plasma creation means;

a pulse waveform power source adapted to [means for] electrically bias [biasing] said mechanical support and said substrate placed thereon, said pulse waveform power source [electrically biasing means] providing a range of electrical bias to said mechanical support and said substrate placed thereon, the range of electrical bias extending from a second electrical potential, which is a negative potential and less than said first electrical potential, to a third electrical potential, which is positive and greater than said first electrical potential, whereby biasing said substrate to said second electrical potential attracts positive ions from said plasma to said substrate for electrically neutralizing said substrate and biasing said substrate to said third electrical potential attracts electrons [ions] from said plasma to said substrate for etching said substrate.

39. (Once Amended) The apparatus of claim 36 [37], wherein said pulse waveform [alternating current] power source biases the mechanical support such that ions of the plasma are attracted to the substrate and electrically neutralize the substrate without damaging the substrate.

40. (Once Amended) The apparatus of claim 36, further including:

[wherein said electrically biasing means includes] a direct current power source adapted to electrically bias said mechanical support and said substrate placed thereon.

42. (Once Amended) The apparatus of claim 36, wherein said pulse waveform power source [biasing means] alternates between applying to said mechanical support a fourth electrical potential ranging between the first and second electrical potentials and a fifth electrical potential ranging between the first and third electrical potentials such that at said fifth electrical potential said substrate is etched and charged by electrons of the plasma and such that at said fourth electrical potential excess electrical charge accumulated on said substrate is essentially neutralized by positive ions from the plasma adhering to the substrate.